CPU SUPERVISORS

FAMILY OVERVIEW

DALLAS
SEMICONDUCTOR

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CPU SUPERVISORS
OVERVIEW

Power Fail Detection

Pushbutton Reset

Referenced Comparator

Power Failure Early Warning Interrupt

Watchdog Timer

Battery Switch

RAM Write Protect

FAMILY SUMMARY OF DEVICES

Dallas Semiconductor manufactures a variety of CPU Supervisors in our Class 1, 6-inch CMOS fabrication facility in Dallas, Texas. CPU Supervisors vary in complexity from simple 3-pin Power Fail Resets to complex 16-pin System Managers capable of managing power and functionality for a microprocessor-based system. All devices detect and send a reset when the power source is out of tolerance. Most of the products are designed to accept a pushbutton reset and are available in the industrial temperature range.

DESCRIPTION
OF FEATURES

5.0-Volt Operation - The device is designed to be operational and control system functions in a 5.0-volt system.

3.3-Volt Operation - The device is designed to be operational and control system functions in a 3.3-volt system.

Power Fail Detection - This feature monitors V_{CC} for an out-of-tolerance condition. On power-up, the reset is held active until supply voltage becomes valid and a minimum reset time passes. On power-down the reset immediately switches to an active state.

Pushbutton Reset - This feature allows a system reset to be generated, using a manually operated, normally open switch between the pushbutton input and ground.

Internally Referenced Comparator - This feature allows the system to monitor a voltage and generate an interrupt if it falls below a critical value. Typical use is to look at the power supply "upstream" for an early warning of power failure.

Watchdog Timer - This function ensures that the μP is not executing invalid code or stuck in a loop. If the device is not strobed on a regular basis, a nonmaskable interrupt is generated.

Active High Reset - An active high reset output is available, typically used by Intel processors.

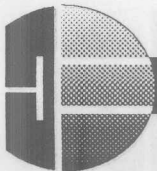**Active Low Reset -** An active low reset output is available, typically used by Motorola processors.

Battery Switch - This function switches V_{CCO} to battery power if the system power (V_{CC}) drops below the battery voltage (V_{BAT}). Useful for battery-backed systems.

RAM Write Protect - This function allows the system $\overline{CE}$ to control $\overline{CEO}$ and enable the RAM only when system power is within tolerance. If system power is out of tolerance, the $\overline{CEO}$ will always disable the RAM.

External Timebase - This feature allows an externally supplied clock signal to determine the duration of both the watchdog timeout and reset duration.

Crystal Oscillator - Circuitry necessary to create an accurate, crystal-controlled 32.768 kHz square wave. Useful for applications needing real time clock functions.

Low Battery Detection - This function monitors and issues an output when the battery voltage is out of tolerance, allowing backup batteries to be replaced before data loss occurs.

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SELECTION GUIDE

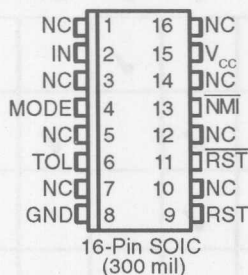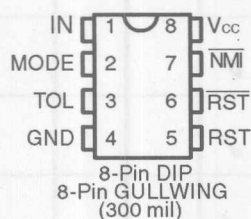| PART #	5.0-VOLT OPERATION	3.3-VOLT OPERATION	POWER FAIL DETECTION	PUSHBUTTON RESET	REFERENCED COMPARATOR	WATCHDOG TIMER	ACTIVE HIGH RESET	ACTIVE LOW RESET	BATTERY SWITCH	RAM WRITE PROTECTION	EXTERNAL TIMEBASE	CRYSTAL OSCILLATOR	LOW BATTERY DETECTION
DS1231	✓		✓		✓		✓	✓					
DS1232/LP	✓		✓	✓		✓	✓	✓					
DS1233	✓		✓					✓					
DS1233A		✓	✓	✓				✓					
DS1233D	✓		✓					✓					
DS1236/A	✓		✓	✓	✓	✓	✓	✓	✓	✓			
DS1238/A	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		
DS1239	✓		✓	✓	✓	✓	✓	✓	✓	✓			
DS1632	✓		✓	✓			✓	✓	✓			✓	✓
DS1832*		✓	✓	✓		✓	✓	✓					
DS1833	✓		✓					✓					

*Product Planned for 1994
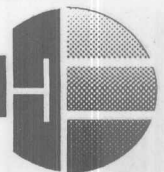
DS1231

POWER MONITOR CHIP

The DS1231 Power Monitor Chip uses a precise temperature-compensated reference circuit which provides an orderly shutdown and an automatic restart of a processor-based system. A signal warning of an impending power failure is generated well before regulated DC voltages go out of specification by monitoring high voltage inputs to the power supply regulators. The time for processor shutdown is directly proportional to the available hold-up time of the power supply. Just before the hold-up time is exhausted, the Power Monitor unconditionally halts the processor to prevent spurious cycles by enabling Reset as V_{CC} falls below a selectable 5% or 10% threshold. When power returns, the processor is held inactive until after power conditions have stabilized, safeguarding any nonvolatile memory in the system from inadvertent data changes.
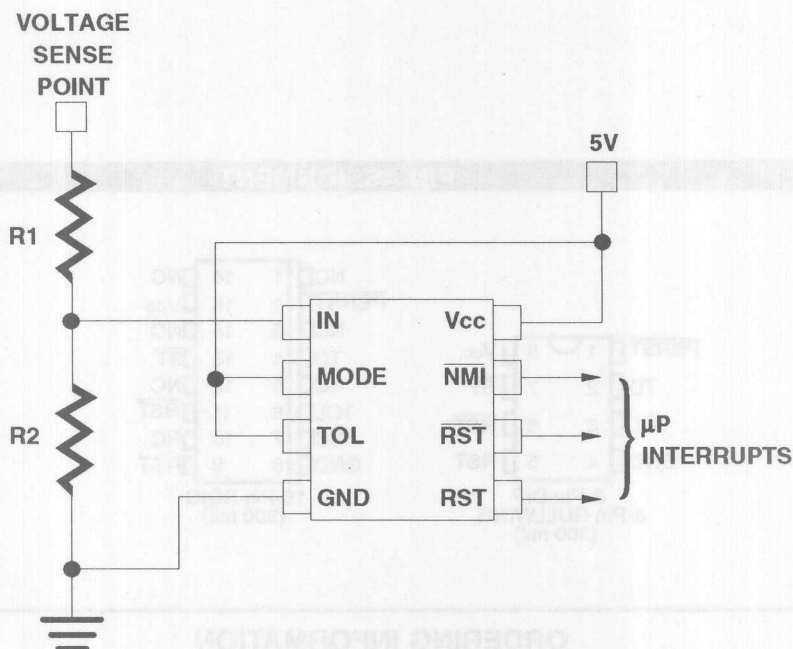
PIN ASSIGNMENT

```
        IN  [ 1   8 ] Vcc
      MODE  [ 2   7 ] NMI
       TOL  [ 3   6 ] RST
       GND  [ 4   5 ] RST
```
8-Pin DIP
8-Pin GULLWING
(300 mil)

```
       NC  [ 1   16 ] NC
       IN  [ 2   15 ] Vcc
       NC  [ 3   14 ] NC
     MODE  [ 4   13 ] NMI
       NC  [ 5   12 ] NC
      TOL  [ 6   11 ] RST
       NC  [ 7   10 ] NC
      GND  [ 8    9 ] RST
```
16-Pin SOIC
(300 mil)

ORDERING INFORMATION

PART #	INPUT HYSTERESIS	TEMPERATURE	PACKAGE
DS1231-20	2.50V to 2.30V	0°C to 70°C	8-Pin DIP
DS1231-20/G	2.50V to 2.30V	0°C to 70°C	8-Pin Gullwing
DS1231-20N	2.50V to 2.30V	-40°C to 85°C	8-Pin DIP
DS1231-35	2.50V to 2.15V	0°C to 70°C	8-Pin DIP
DS1231-35/G	2.50V to 2.15V	0°C to 70°C	8-Pin Gullwing
DS1231-35N	2.50V to 2.15V	-40°C to 85°C	8-Pin DIP
DS1231-50	2.50V to 2.00V	0°C to 70°C	8-Pin DIP
DS1231-50/G	2.50V to 2.00V	0°C to 70°C	8-Pin Gullwing
DS1231-50N	2.50V to 2.00V	-40°C to 85°C	8-Pin DIP
DS1231S-20	2.50V to 2.30V	0°C to 70°C	16-Pin SOIC
DS1231S-20T&R	2.50V to 2.30V	0°C to 70°C	16-Pin SOIC Tape & Reel
DS1231S-20N	2.50V to 2.30V	-40°C to 85°C	16-Pin SOIC
DS1231S-35	2.50V to 2.15V	0°C to 70°C	16-Pin SOIC
DS1231S-50	2.50V to 2.00V	0°C to 70°C	16-Pin SOIC
DS1231S-50T&R	2.50V to 2.00V	0°C to 70°C	16-Pin SOIC Tape & Reel
DS1231S-50N	2.50V to 2.00V	-40°C to 85°C	16-Pin SOIC

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DS1231
APPLICATION EXAMPLE

In a typical application, the DS1231 will perform an early warning of a power fail via the $\overline{\text{NMI}}$ output based on the voltage level at the sense point (generally a point close to the system power supply). It will also perform a power-on reset and a reset based on an out-of-tolerance condition at the V_{CC} input which in the example below must be >5V-10% to be within tolerance.

VOLTAGE
SENSE
POINT

5V

R1

IN   Vcc

MODE $\overline{\text{NMI}}$

R2

TOL $\overline{\text{RST}}$

GND   RST

}μP
INTERRUPTS

INPUT HYSTERESIS			
DEVICE	-20	-35	-50
VTP-	2.3	2.15	2.0
VTP+	2.5	2.50	2.5

Resistance values are determined by the formulas:

$$V \text{ Sense} = \frac{R1+R2}{R2} \times V_{TP} \quad \& \quad V \text{ MAX} = \frac{V \text{ SENSE}}{V_{TP-}} \times 5.0$$
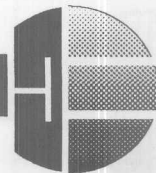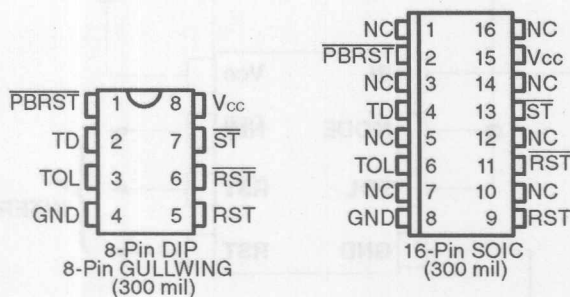
DS1232

MICROMONITOR CHIP

The DS1232 MicroMonitor Chip monitors three vital conditions for a microprocessor: power supply, software execution, and external override. First, a precision temperature-compensated reference and comparator circuit monitors the status of V_{CC}. When an out-of-tolerance condition exists, an internal power fail signal is generated which forces reset to the active state. When power returns to a valid level, reset is held active for a minimum of 250 ms to allow the power supply and processor to stabilize. The second function the DS1232 performs is pushbutton reset control. The DS1232 debounces the pushbutton input and guarantees an active reset pulse width of 250 ms minimum. The third function is a watchdog timer. The DS1232 has an internal timer that forces the reset signals to the active state if the strobe input is not driven low prior to timeout. The watchdog timer function can be set to operate on timeout settings of approximately 150 ms, 600 ms, and 1.2 seconds.

PIN ASSIGNMENT

```
      ┌───┐                          ┌───┐
PBRST │1 8│ Vcc           NC   │1  16│ NC
 TD   │2 7│ ST          PBRST  │2  15│ Vcc
 TOL  │3 6│ RST           NC   │3  14│ NC
 GND  │4 5│ RST           TD   │4  13│ ST
      └───┘                NC   │5  12│ NC
                          TOL  │6  11│ RST
    8-Pin DIP              NC   │7  10│ NC
  8-Pin GULLWING          GND   │8   9│ RST
    (300 mil)                  └───┘
                           16-Pin SOIC
                            (300 mil)
```

ORDERING INFORMATION		
PART #	**TEMPERATURE**	**PACKAGE**
DS1232	0°C to 70°C	8-Pin DIP
DS1232/GN	-40°C to 85°C	8-Pin Gullwing
DS1232N	-40°C to 85°C	8-Pin DIP
DS1232S	0°C to 70°C	16-Pin SOIC
DS1232S/T&R	0°C to 70°C	16-Pin SOIC Tape & Reel
DS1232SN-4	0°C to 85°C	16-Pin SOIC
DS1232SN/T&R	-40°C to 85°C	16-Pin SOIC Tape & Reel

DS1232LP

LOW-POWER MICROMONITOR CHIP

The DS1232LP Low-Power MicroMonitor Chip monitors three vital conditions for a microprocessor: power supply, software execution, and external override. First, a precision temperature-compensated reference and comparator circuit monitors the status of V_{CC}. When an out-of-tolerance condition occurs, an internal power fail signal is generated which forces reset to the active state for a minimum of 250 ms to allow the power supply and processor to stabilize. The second function the DS1232LP performs is pushbutton reset control. The DS1232 debounces the pushbutton input and guarantees an active reset pulse width of 250 ms minimum. The third function is a watchdog timer. The DS1232LP has an internal timer that forces the reset signals to the active state if the strobe input is not driven low prior to timeout. The watchdog timer function can be set to operate on timeout settings of approximately 150 ms, 600 ms, and 1.2 seconds.The DS1232LP performs the above functions using 50 µA or less of operating current. Low power consumption makes the DS1232LP the perfect choice for battery-operated products or power-sensitive applications.


PIN ASSIGNMENT

8-Pin DIP (300 mil)

8-Pin SOIC (150 mil)

16-Pin SOIC (300 mil)
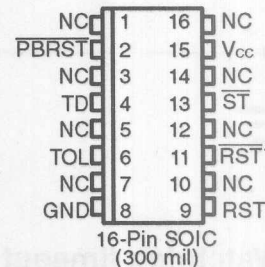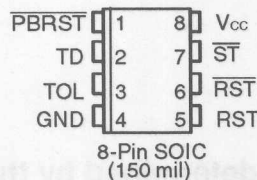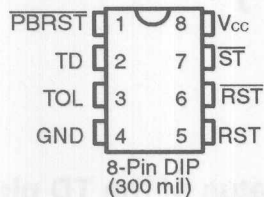
ORDERING INFORMATION

PART #	TEMPERATURE	PACKAGE
DS1232LP	0°C to 70°C	8-Pin DIP
DS1232LPN	-40°C to 85°C	8-Pin DIP
DS1232LPS	0°C to 70°C	16-Pin SOIC
DS1232LPS-2	0°C to 70°C	8-Pin SOIC
DS1232LPSN	-40°C to 85°C	16-Pin SOIC Tape & Reel

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DS1232
APPLICATION EXAMPLE

This application example demonstrates the DS1232 performing the functions of a watchdog with a 500ms minimum timeout using a microprocessor data I/O line for the strobe input. The reset outputs are driven active if a timeout occurs. The pushbutton allows the user to send the resets active based on driving the PBRST input to ground. It also performs a power on-reset and a reset based on an out-of-tolerance condition at the V_{CC} input, which in the example below must be >5V-10% to be within tolerance.
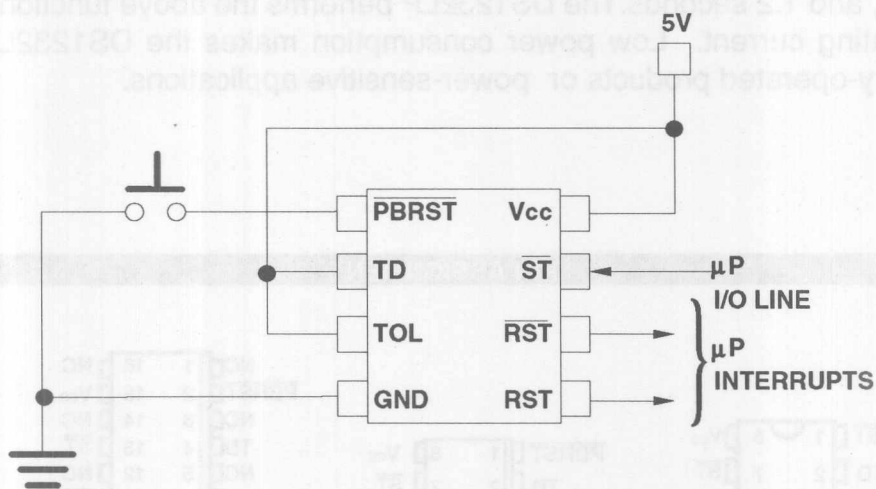
The Watchdog timeout is determined by the status of the TD pin.

WATCHDOG TIMEOUT			
TD PIN	MINIMUM	TYPICAL	MAXIMUM
Ground	62.5 ms	150 ms	250 ms
Float	250 ms	600 ms	1000 ms
V_{CC}	500 ms	1200 ms	2000 ms

DS1233, DS1233A

ECONORESET CHIP

The DS1233 EconoReset Chip monitors two vital conditions for a microprocessor: power supply and external override. A precision temperature-compensated reference and comparator circuit are used to monitor the status of the power supply (Vcc). When an out-of-tolerance condition is detected, an internal power fail signal is generated which forces reset to the active state. When Vcc returns to an in-tolerance condition, the reset signal is kept in the active state for approximately 350 ms to allow the power supply and processor to stabilize. The second function of the DS1233 is pushbutton reset control. The DS1233 debounces a pushbutton closure and will generate a 350 ms reset pulse upon release.The DS1233 and DS1233A both perform the above functions using less than 50 µA of operating current. Low power consumption makes the DS1233 the perfect choice for battery-operated products or power-sensitive applications.
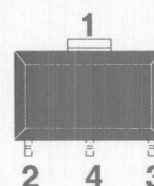
PIN ASSIGNMENT

PIN DESCRIPTION

PIN 1 - GROUND
PIN 2 - RESET
PIN 3 - Vcc
PIN 4 - GROUND (SOT-223 ONLY)

TO-92 Package

1

2   4   3

SOT-223 PACKAGE

ORDERING INFORMATION

PART #	Vcc TRIP POINT	TEMPERATURE	PACKAGE
DS1233-5	5V - 5%	-40°C to 85°C	TO-92
DS1233-5/T&R	5V - 5%	-40°C to 85°C	TO-92 Tape & Reel
DS1233-10	5V - 10%	-40°C to 85°C	TO-92
DS1233-10/T&R	5V - 10%	-40°C to 85°C	TO-92 Tape & Reel
DS1233-15	5V - 15%	-40°C to 85°C	TO-92
DS1233-15/T&R	5V - 15%	-40°C to 85°C	TO-92 Tape & Reel
DS1233A-10	3V - 10%	-40°C to 85°C	TO-92
DS1233A-10/T&R	3V - 10%	-40°C to 85°C	TO-92 Tape & Reel
DS1233A-15	3V - 15%	-40°C to 85°C	TO-92
DS1233A-15/T&R	3V - 15%	-40°C to 85°C	TO-92 Tape & Reel
DS1233AZ-10	3V - 10%	-40°C to 85°C	SOT-223
DS1233AZ-10/T&R	3V - 10%	-40°C to 85°C	SOT-223 Tape & Reel
DS1233AZ-15	3V - 15%	-40°C to 85°C	SOT-223
DS1233AZ-15/T&R	3V - 15%	-40°C to 85°C	SOT-223 Tape & Reel
DS1233Z-5	5V - 5%	-40°C to 85°C	SOT-223
DS1233Z-10	5V - 10%	-40°C to 85°C	SOT-223
DS1233Z-10/T&R	5V - 10%	-40°C to 85°C	SOT-223 Tape & Reel
DS1233Z-15	5V - 15%	-40°C to 85°C	SOT-223
DS1233Z-15/T&R	5V - 15%	-40°C to 85°C	SOT-223 Tape & Reel

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DS1233D

ECONO RESET CHIP

The DS1233 EconoReset Chip uses a precision temperature-compensated reference and comparator circuit to monitor the status of the power supply (V_{CC}). When an out-of-tolerance condition is detected, an internal power fail signal is generated which forces reset to the active state. When V_{CC} returns to an in-tolerance condition, the reset signal is kept in the active state for approximately 350 ms to allow the power supply and processor to stabilize. The DS1233D operates exactly like the DS1233 except the pushbutton reset function has been removed to support the Motorola 68300 series microprocessors. The DS1233D performs the above functions using less than 50 µA of operating current. Low power consumption makes the DS1233 the perfect choice for battery-operated products or power-sensitive applications.

PIN ASSIGNMENT
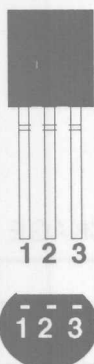
PIN DESCRIPTION

PIN 1 - GROUND
PIN 2 - RESET
PIN 3 - V_{CC}
PIN 4 - GROUND (SOT-223 ONLY)
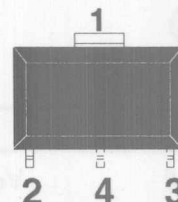
TO-92 Package

SOT-223 Package

ORDERING INFORMATION

| PART #	V_{CC} TRIP POINT	TEMPERATURE	PACKAGE
DS1233D-5	5V - 5%	-40°C to 85°C	TO-92
DS1233D-10	5V - 10%	-40°C to 85°C	TO-92
DS1233D-10/T&R	5V - 10%	-40°C to 85°C	TO-92 Tape & Reel
DS1233D-15	5V - 15%	-40°C to 85°C	TO-92
DS1233D-15/T&R	5V - 15%	-40°C to 85°C	TO-92 Tape & Reel
DS1233DZ-5	5V - 5%	-40°C to 85°C	SOT-223
DS1233DZ-5/T&R	5V - 5%	-40°C to 85°C	SOT-223 Tape & Reel
DS1233DZ-10	5V - 10%	-40°C to 85°C	SOT-223
DS1233DZ-10/T&R	5V - 15%	-40°C to 85°C	SOT-223
DS1233DZ-15	5V - 15%	-40°C to 85°C	SOT-223
DS1233DZ-15/T&R	5V - 15%	-40°C to 85°C	SOT-223 Tape & Reel

DS1233

APPLICATION EXAMPLE

The application example below demonstrates the DS1233 and DS1233A performing reset functions. (The DS1233D does not perform pushbutton functions.) The DS1233 debounces the user-initiated pushbutton reset and sends the reset active based on driving the PBRST input to ground. It also performs a power-on reset and a reset based on an out-of-tolerance condition at the Vcc input.
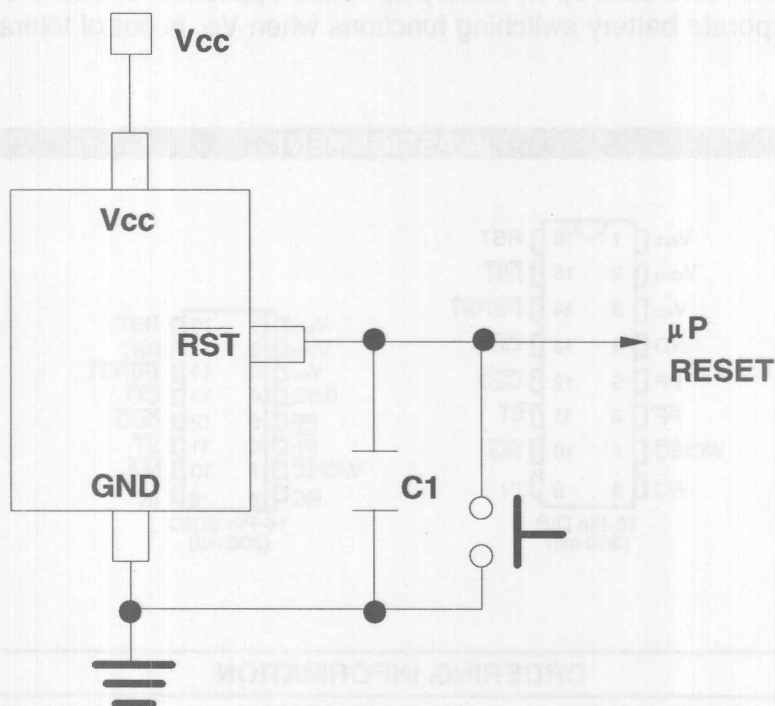
NOTE: For proper operation of the pushbutton function, the capacitor C1 should be 100 pF to 0.01 µF. In applications where additional reset current is required, a minimum 500 pF capacitor should be used along with a parallel 1 kΩ minimum.
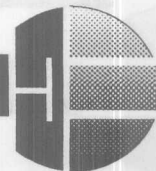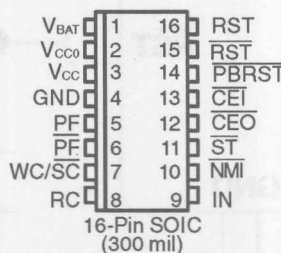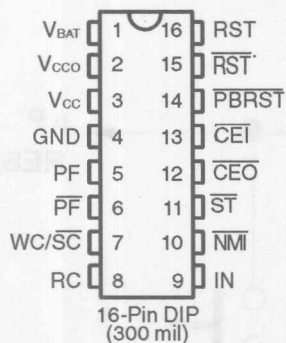
DS1236

MICRO MANAGER CHIP

The DS1236 MicroManager Chip provides all the necessary functions for power supply monitoring, reset control, and memory backup in microprocessor-based systems. A precise internal voltage reference and comparator circuit monitor power supply status. When an out-of-tolerance condition occurs, the microprocessor reset and power fail outputs are forced active, and static RAM control unconditionally write protects external memory. The DS1236 also provides early warning detection of a user-defined threshold by driving a non-maskable interrupt. External reset control is provided by a pushbutton reset input which is debounced and activates reset outputs. An internal watchdog timer can also force the reset outputs to the active state if the strobe input is not driven low prior to watchdog timeout. Reset control and wake-up/sleep control inputs also provide the necessary signals for orderly shutdown and start-up in battery-operated applications. See the DS1236A for designs that do not incorporate battery switching functions when V_{CC} is out of tolerance.

PIN ASSIGNMENT

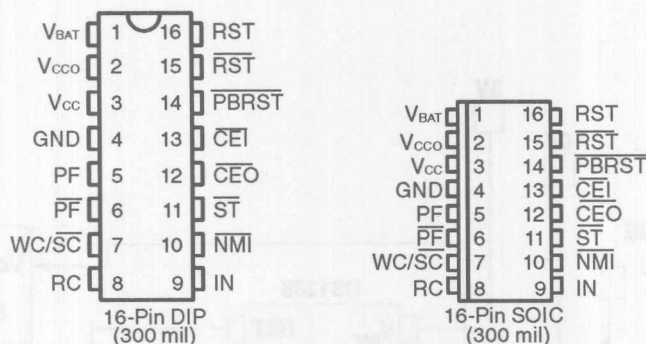| V_{BAT} | 1 | 16 | RST |
V_{CCO}	2	15	$\overline{RST}$
V_{CC}	3	14	$\overline{PBRST}$
GND	4	13	$\overline{CEI}$
PF	5	12	$\overline{CEO}$
$\overline{PF}$	6	11	$\overline{ST}$
WC/$\overline{SC}$	7	10	$\overline{NMI}$
RC	8	9	IN

16-Pin DIP
(300 mil)

V_{BAT}	1	16	RST
V_{CCO}	2	15	$\overline{RST}$
V_{CC}	3	14	$\overline{PBRST}$
GND	4	13	$\overline{CEI}$
PF	5	12	$\overline{CEO}$
$\overline{PF}$	6	11	$\overline{ST}$
WC/$\overline{SC}$	7	10	$\overline{NMI}$
RC	8	9	IN

16-Pin SOIC
(300 mil)

ORDERING INFORMATION

PART #	V_{CC} TRIP POINT	TEMPERATURE	PACKAGE
DS1236	5V - 10%	0°C to 70°C	16-Pin DIP
DS1236-5	5V - 5%	0°C to 70°C	16-Pin DIP
DS1236N	5V - 10%	-40°C to 85°C	16-Pin DIP
DS1236N-5	5V - 5%	-40°C to 85°C	16-Pin DIP
DS1236S	5V - 10%	0°C to 70°C	16-Pin SOIC
DS1236S-5	5V - 5%	0°C to 70°C	16-Pin SOIC
DS1236S/T&R	5V - 10%	0°C to 70°C	16-Pin SOIC Tape & Reel
DS1236S-5/T&R	5V - 5%	0°C to 70°C	16-Pin SOIC Tape & Reel
DS1236SN	5V - 10%	-40°C to 85°C	16-Pin SOIC
DS1236SN-5	5V - 5%	-40°C to 85°C	16-Pin SOIC
DS1236SN/T&R	5V - 10%	-40°C to 85°C	16-Pin SOIC Tape & Reel

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DS1236A

MICRO MANAGER CHIP

The DS1236A MicroManager Chip provides all the necessary functions for power supply monitoring, reset control, and memory backup in microprocessor-based systems. The DS1236A functions exactly like the DS1236 except the Freshness Seal can only be invoked when the battery is first attached and Vcc is not within tolerance. The device is specifically designed for systems that do not use a battery to power the DS1236A in the absence of Vcc power or designs that will not be implementing a Freshness Seal.

```
          VBAT  1      16  RST
          VCCO  2      15  RST
          VCC   3      14  PBRST
          GND   4      13  CEI
          PF    5      12  CEO
          PF    6      11  ST
        WC/SC   7      10  NMI
          RC    8       9  IN
              16-Pin DIP
               (300 mil)

          VBAT  1      16  RST
          VCCO  2      15  RST
          VCC   3      14  PBRST
          GND   4      13  CEI
          PF    5      12  CEO
          PF    6      11  ST
        WC/SC   7      10  NMI
          RC    8       9  IN
              16-Pin SOIC
               (300 mil)
```

| ORDERING INFORMATION			
PART #	Vcc TRIP POINT	TEMPERATURE	PACKAGE
DS1236A	5V - 10%	0°C to 70°C	16-Pin DIP
DS1236A-5	5V - 5%	0°C to 70°C	16-Pin DIP
DS1236AN	5V - 10%	-40°C to 85°C	16-Pin DIP
DS1236AN-5	5V - 5%	-40°C to 85°C	16-Pin DIP
DS1236AS	5V - 10%	0°C to 70°C	16-Pin SOIC
DS1236AS-5	5V - 5%	0°C to 70°C	16-Pin SOIC
DS1236AS/T&R	5V - 10%	0°C to 70°C	16-Pin SOIC Tape & Reel
DS1236AS-5/T&R	5V - 5%	0°C to 70°C	16-Pin SOIC Tape & Reel
DS1236ASN	5V - 10%	-40°C to 85°C	16-Pin SOIC
DS1236ASN-5	5V - 5%	-40°C to 85°C	16-Pin SOIC
DS1236ASN/T&R	5V - 10%	-40°C to 85°C	16-Pin SOIC Tape & Reel

DALLAS
SEMICONDUCTOR

DS1236

APPLICATION EXAMPLE

The application below demonstrates the DS1236 in a system with a battery-backed SRAM. The SRAM V_{CC} is attached to switched output V_{CCO}. V_{CCO} outputs V_{CC} or V_{BAT} if V_{CC} is out of tolerance. $\overline{CEO}$ is controlled by $\overline{CEI}$ unless V_{CC} is out of tolerance; then $\overline{CEO}$ is disabled to protect the SRAM data integrity. Other functions being managed by the DS1236 in this example include watchdog reset, power fail reset, and early warning reset. The sleep control (WC/$\overline{SC}$) and power fail (PF) functions can add even further power control. WC/$\overline{SC}$ can be used to place the DS1236 into a low current state for extended periods of inactivity. Sleep mode disables RST, $\overline{RST}$, and $\overline{NMI}$ outputs as well as the $\overline{ST}$ and IN inputs. PF and $\overline{PF}$ outputs can be used to control the DS1336 when additional power switching is required between a battery and V_{CC}.
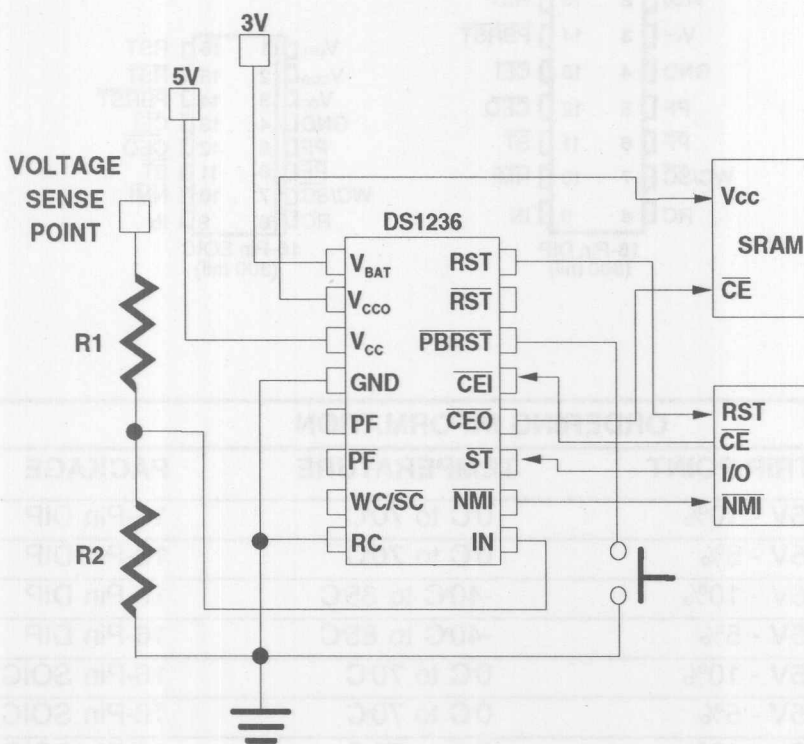
Resistance values are determined by the formulas:

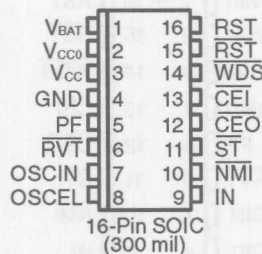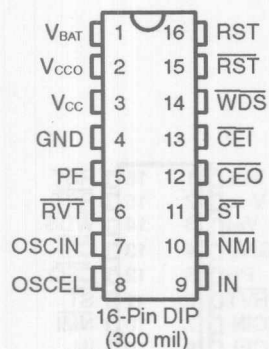$$V\ Sense = \frac{R1+R2}{R2} \times V_{TP} \quad \& \quad V\ MAX = \frac{V\ SENSE}{V_{TP-}} \times 5.0$$
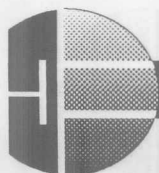
DS1238

MICRO MANAGER CHIP

The DS1238 MicroManager Chip provides all the necessary functions for power supply monitoring, reset control, and memory backup in microprocessor-based systems. A precise internal voltage reference and comparator circuit monitor power supply status. When an out-of-tolerance condition occurs, the microprocessor reset and power fail outputs are forced active, and static RAM control unconditionally write protects external memory. The DS1238 also provides early warning detection of a user-defined threshold by driving a non-maskable interrupt. External reset control is provided by a pushbutton reset debounce circuit connected to the RST pin. An internal watchdog timer can also force the reset outputs to the active state if the strobe input is not driven low prior to watchdog timeout. Oscillator control pins OSCSEL and OSCIN provide either external or internal clock timing for both the reset pulse width and the watchdog timeout period. The Watchdog Status and Reset Voltage Threshold are provided via WDS and RVT, respectively. See the DS1238A for designs that do not incorporate battery switching functions when Vcc is out of tolerance.

PIN ASSIGNMENT

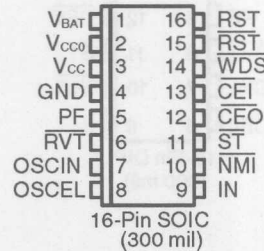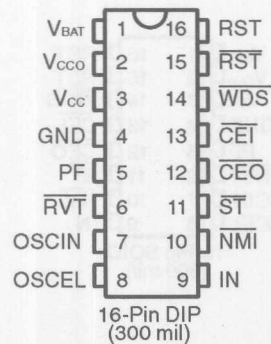|	16-Pin DIP (300 mil)			16-Pin SOIC (300 mil)
V_{BAT}	1 — 16	RST	V_{BAT}	1 — 16 RST
V_{CCO}	2 — 15	$\overline{RST}$	V_{CCO}	2 — 15 $\overline{RST}$
V_{CC}	3 — 14	$\overline{WDS}$	V_{CC}	3 — 14 $\overline{WDS}$
GND	4 — 13	$\overline{CEI}$	GND	4 — 13 $\overline{CEI}$
PF	5 — 12	$\overline{CEO}$	PF	5 — 12 $\overline{CEO}$
$\overline{RVT}$	6 — 11	$\overline{ST}$	$\overline{RVT}$	6 — 11 $\overline{ST}$
OSCIN	7 — 10	$\overline{NMI}$	OSCIN	7 — 10 $\overline{NMI}$
OSCEL	8 — 9	IN	OSCEL	8 — 9 IN

ORDERING INFORMATION

PART #	Vcc TRIP POINT	TEMPERATURE	PACKAGE
DS1238	5V - 10%	0°C to 70°C	16-Pin DIP
DS1238-5	5V - 5%	0°C to 70°C	16-Pin DIP
DS1238N	5V - 10%	-40°C to 85°C	16-Pin DIP
DS1238S	5V - 10%	0°C to 70°C	16-Pin SOIC
DS1238S-5	5V - 5%	0°C to 70°C	16-Pin SOIC

DS1238A
MICROMANAGER CHIP

The DS1238A MicroManager Chip provides all the necessary functions for power supply monitoring, reset control, and memory backup in microprocessor based systems. The DS1238A functions exactly like the DS1238 except the Freshness Seal can only be invoked when the battery is first attached and Vcc is not within tolerance. The device is specifically designed for systems that do not use a battery to power the DS1238A in the absence of Vcc power or designs that will not be implementing a Freshness Seal.

PIN ASSIGNMENT

```
        VBAT  1    16  RST
        VCCO  2    15  RST
        VCC   3    14  WDS
        GND   4    13  CEI
        PF    5    12  CEO
        RVT   6    11  ST
        OSCIN 7    10  NMI
        OSCEL 8     9  IN
          16-Pin DIP
           (300 mil)
```

```
        VBAT  1    16  RST
        VCCO  2    15  RST
        VCC   3    14  WDS
        GND   4    13  CEI
        PF    5    12  CEO
        RVT   6    11  ST
        OSCIN 7    10  NMI
        OSCEL 8     9  IN
          16-Pin SOIC
           (300 mil)
```

ORDERING INFORMATION

PART #	Vcc TRIP POINT	TEMPERATURE	PACKAGE
DS1238A	5V - 10%	0°C to 70°C	16-Pin DIP
DS1238A-5	5V - 5%	0°C to 70°C	16-Pin DIP
DS1238AN	5V - 10%	-40°C to 85°C	16-Pin DIP
DS1238AS	5V - 10%	0°C to 70°C	16-Pin SOIC
DS1238AS-5	5V - 5%	0°C to 70°C	16-Pin SOIC

DALLAS
SEMICONDUCTOR

DS1238

APPLICATION EXAMPLE

The DS1238 in the application below is nonvolatizing an SRAM, debouncing a pushbutton reset, and monitoring a µP and Vcc. The SRAM Vcc is attached to switched output Vcco. Vcco outputs Vcc or VBAT if Vcc is out of tolerance. $\overline{CEO}$ is controlled by $\overline{CEI}$ unless Vcc is out of tolerance; then $\overline{CEO}$ is disabled to protect the SRAM data integrity. Other functions being managed by the DS1238 in this example include watchdog reset and power fail reset. The watchdog in this example is using an external clock to determine the reset timing. The first timeout period following a reset will be 20480 clocks, thereafter 5120 clocks, and if a reset occurs it will have an active duration of 641 clocks. Other watchdog timeouts can be achieved by using a capacitor on the OSCIN pin or using the products' internally selectable timeouts without using external components. If a watchdog reset occurs, the $\overline{WDS}$ as well as RST and $\overline{RST}$ outputs will all go active. Additional functions available include power fail early warning (IN & $\overline{NMI}$), reset voltage threshold ($\overline{RVT}$) output, and power fail (PF) output. The early warning power fail feature forces the $\overline{NMI}$ output active in case of an out-of-tolerance condition on the IN input; the reset voltage threshold is forced active whenever Vcc is out-of-tolerance. The PF output can be used to control the DS1336 Afterburner Chip (see 1994-95 System Extension data book) when current requirements exceed the Vcco capabilities of the DS1238.
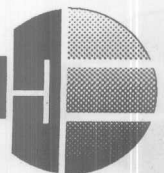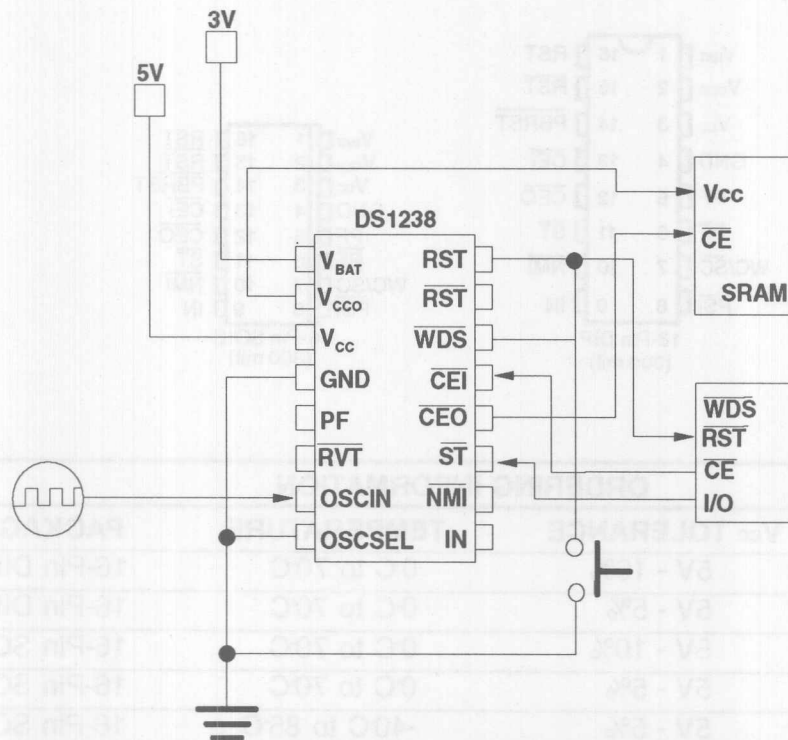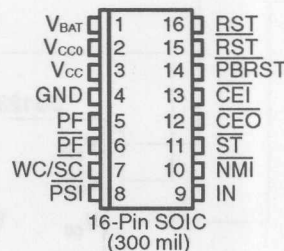
DS1239

MICRO MANAGER CHIP

The DS1239 MicroManager Chip provides all the necessary functions for power supply monitoring, reset control, and memory backup in microprocessor-based systems. With the DS1239, an AC power switch is no longer required for microprocessor-based systems. A keyboard control system for power supply start up and shutdown is provided through the use of the Power Supply Control Input and Output. In other respects, the DS1239 is functionally identical to a DS1236 in the NMOS mode. A precise internal voltage reference and comparator circuit monitor power supply status. When an out-of-tolerance condition occurs, the microprocessor reset and power fail outputs are forced active, and static RAM control unconditionally write protects external memory. The DS1239 also provides early warning detection of a user-defined threshold by driving a non-maskable interrupt. External reset control is provided by a pushbutton reset input which is debounced and activates reset outputs. An internal watchdog timer can also force the reset outputs to the active state if the strobe input is not driven low prior to watchdog timeout. Reset control and wake-up/sleep control inputs also provide the necessary signals for orderly shutdown and start-up in battery operated applications.

PIN ASSIGNMENT

	16-Pin DIP (300 mil)			16-Pin SOIC (300 mil)	
V_{BAT}	1	16 RST	V_{BAT}	1	16 $\overline{RST}$
V_{CCO}	2	15 $\overline{RST}$	V_{CCO}	2	15 RST
V_{CC}	3	14 $\overline{PBRST}$	V_{CC}	3	14 $\overline{PBRST}$
GND	4	13 $\overline{CEI}$	GND	4	13 $\overline{CEI}$
PF	5	12 $\overline{CEO}$	PF	5	12 $\overline{CEO}$
$\overline{PF}$	6	11 $\overline{ST}$	$\overline{PF}$	6	11 $\overline{ST}$
WC/$\overline{SC}$	7	10 $\overline{NMI}$	WC/$\overline{SC}$	7	10 $\overline{NMI}$
$\overline{PSI}$	8	9 IN	$\overline{PSI}$	8	9 IN

ORDERING INFORMATION

PART #	V_{CC} TOLERANCE	TEMPERATURE	PACKAGE
DS1239	5V - 10%	0°C to 70°C	16-Pin DIP
DS1239-5	5V - 5%	0°C to 70°C	16-Pin DIP
DS1239S	5V - 10%	0°C to 70°C	16-Pin SOIC
DS1239S-5	5V - 5%	0°C to 70°C	16-Pin SOIC
DS1239S-5N	5V - 5%	-40°C to 85°C	16-Pin SOIC

DALLAS SEMICONDUCTOR

DS1239

APPLICATION EXAMPLE

In the application below, the DS1239 performs the system power-on function, pushbutton reset, power-on reset, watchdog reset, and battery backup of an SRAM. The SRAM, watchdog and µP connections can be seen in previous examples. Control of the DC power supply via the DS1239 is shown below using a pushbutton (P1) to control the latched output of PSO. PSO then controls an optically isolated SCR to initiate an AC-to-DC power-up sequence. The early warning, sleep control (WC/SC) and power fail (PF) functions are not in use but can add further power control.
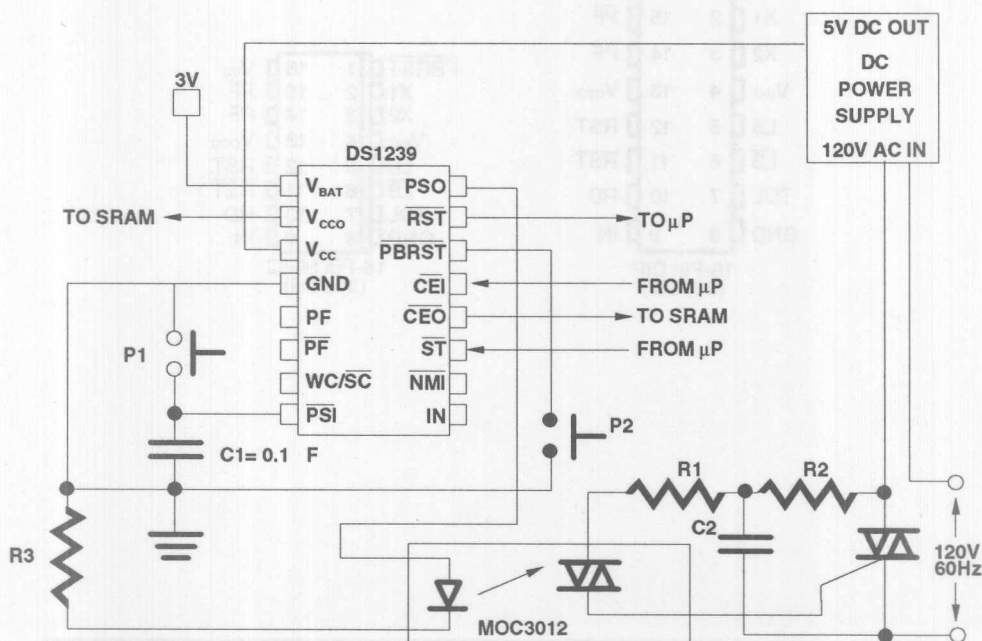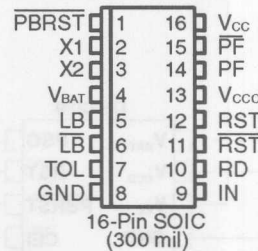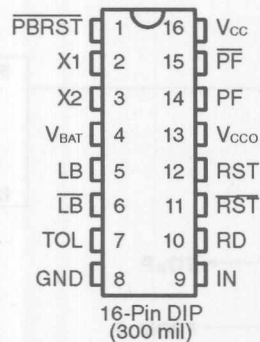
DS1632

PC POWER FAIL AND RESET CONTROLLER

The DS1632 PC Power Fail and Reset Controller provides a 32.768 kHz battery-backed crystal oscillator and switched V_{CC}/V_{BAT} power via V_{CCO} for the real time clock function located in accompanying chip sets. In addition, the DS1632 provides for reset on both power-up and via pushbutton input, power fail status signals for the processor, and low battery warning signals. The DS1632 is capable of detecting power failure at both 5% and 10% power supply tolerances, and the reset pulse width can be set for either 100 ms or 200 ms. The device is designed to eliminate the need for discrete components and reduce system costs.

	16-Pin DIP (300 mil)	
$\overline{PBRST}$	1	16 V_{CC}
X1	2	15 $\overline{PF}$
X2	3	14 PF
V_{BAT}	4	13 V_{CCO}
LB	5	12 RST
$\overline{LB}$	6	11 $\overline{RST}$
TOL	7	10 RD
GND	8	9 IN

	16-Pin SOIC (300 mil)	
$\overline{PBRST}$	1	16 V_{CC}
X1	2	15 $\overline{PF}$
X2	3	14 PF
V_{BAT}	4	13 V_{CCO}
LB	5	12 RST
$\overline{LB}$	6	11 $\overline{RST}$
TOL	7	10 RD
GND	8	9 IN

ORDERING INFORMATION

PART #	TEMPERATURE	PACKAGE
DS1632	0°C to 70°C	16-Pin DIP
DS1632S	0°C to 70°C	16-Pin SOIC

DS1632

APPLICATION EXAMPLE

The DS1632 is shown controlling a 386SL Superset to provide reset control, a 32768 Hz output, and a switched power out. $\overline{PF}$ in the example warns the 386SL processor of a Vcc problem and causes the processor to reset. RST and $\overline{RST}$ provide processor and chip set resets for pushbutton resets and power on/off conditions. Vcco supplies continuous power by switching to either Vcc or VBAT, whichever is greater. LB and $\overline{LB}$ are driven active if the VBAT input drops below 2.5 volts, thereby warning the system of a low battery. The 32768 Hz, 6 pF crystal maintains an accurate 32768 Hz oscillator. The 32768 Hz square wave out is designed to drive an external clock counter or oscillator input. Other possible applications might use the DS1336 Afterburner Chip (see 1994-95 System Extension data book) and the PF outputs to achieve higher current outputs. Also, the square wave/oscillator out could be used as a low current 32768 Hz system clock for low-speed applications.
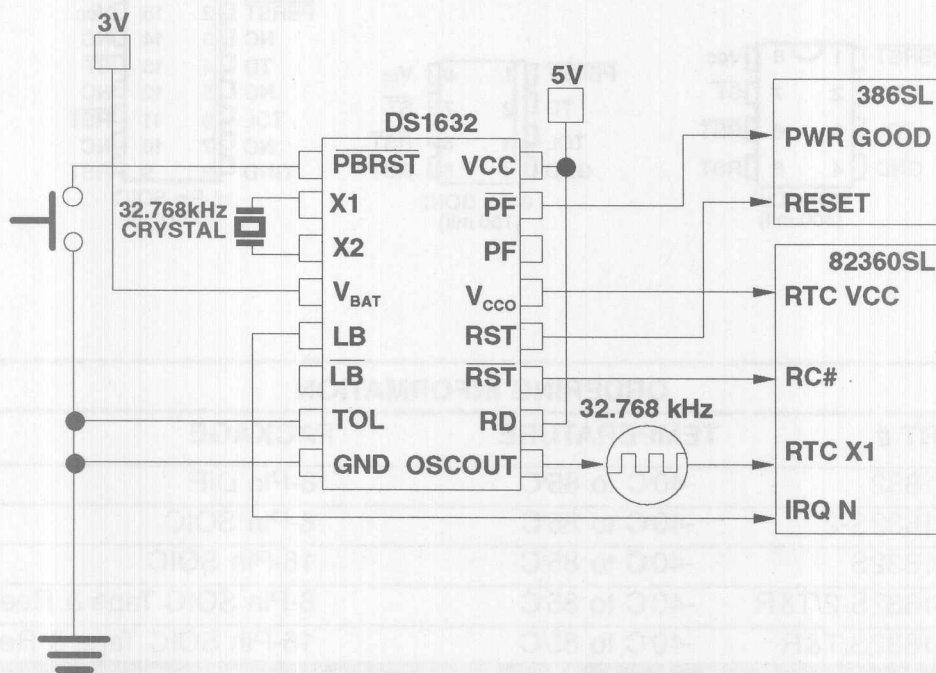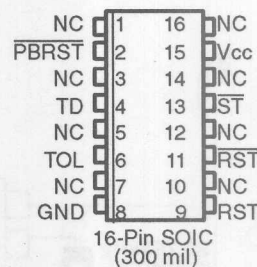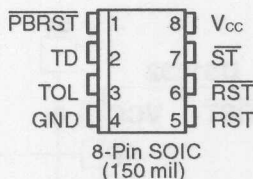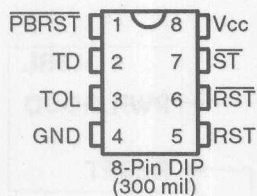
DS1832

3.3-VOLT MICROMONITOR CHIP

PLANNED FOR 1994

The DS1832 3.3-Volt MicroMonitor Chip monitors three vital conditions for a microprocessor: power supply, software execution, and external override. First, a precision temperature-compensated reference and comparator circuit monitors the status of V_{CC}. When an out-of-tolerance condition occurs, an internal power fail signal is generated which forces reset to the active state. When V_{CC} returns to an in-tolerance condition, the reset signals are kept in the active state for a minimum of 250 ms to allow the power supply and processor to stabilize. The second function the DS1832 performs is pushbutton reset control. The DS1832 debounces the pushbutton input and guarantees an active reset pulse width of 250 ms minimum. The third function is a watchdog timer. The DS1832 has an internal timer that forces the reset signals to the active state if the strobe input is not driven low prior to timeout. The watchdog timer function can be set to operate on timeout settings of approximately 150 ms, 600 ms, and 1.2 seconds.

PIN ASSIGNMENT

|	8-Pin DIP (300 mil)		8-Pin SOIC (150 mil)		16-Pin SOIC (300 mil)

8-Pin DIP (300 mil)
PBRST 1 — 8 Vcc
TD 2 — 7 $\overline{ST}$
TOL 3 — 6 $\overline{RST}$
GND 4 — 5 RST

8-Pin SOIC (150 mil)
PBRST 1 — 8 Vcc
TD 2 — 7 $\overline{ST}$
TOL 3 — 6 $\overline{RST}$
GND 4 — 5 RST

16-Pin SOIC (300 mil)
NC 1 — 16 NC
PBRST 2 — 15 Vcc
NC 3 — 14 NC
TD 4 — 13 $\overline{ST}$
NC 5 — 12 NC
TOL 6 — 11 $\overline{RST}$
NC 7 — 10 NC
GND 8 — 9 RST

ORDERING INFORMATION

PART #	TEMPERATURE	PACKAGE
DS1832	-40°C to 85°C	8-Pin DIP
DS1832S-2	-40°C to 85°C	8-Pin SOIC
DS1832S	-40°C to 85°C	16-Pin SOIC
DS1832S-2/T&R	-40°C to 85°C	8-Pin SOIC Tape & Reel
DS1832S/T&R	-40°C to 85°C	16-Pin SOIC Tape & Reel

DALLAS
SEMICONDUCTOR

DS1833

5-VOLT ACTIVE HIGH ECONO RESET CHIP

The DS1833 5-Volt EconoReset Chip uses a precision temperature-compensated reference and comparator circuit to monitor the status of the power supply (Vcc). When an out-of-tolerance condition is detected, an internal power fail signal is generated which forces reset to the active (high) state. When Vcc returns to an in-tolerance condition, the reset signal is kept in the active state for approximately 350 ms to allow the power supply and processor to stabilize.

PIN ASSIGNMENT

1 2 3

1 2 3
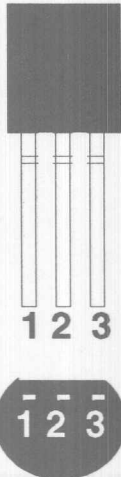
TO-92 Package

PIN DESCRIPTION
PIN 1 - GROUND
PIN 2 - RESET
PIN 3 - Vcc
PIN 4 - GROUND (SOT-223 ONLY)

1

2   4   3
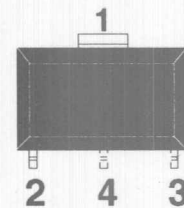
SOT-223 Package

ORDERING INFORMATION

PART #	VCC TOLERANCE	TEMPERATURE	PACKAGE
DS1833-5	5V - 5%	-40°C to 85°C	TO-92
DS1833-5/T&R	5V - 5%	-40°C to 85°C	TO-92 Tape & Reel
DS1833-10	5V - 10%	-40°C to 85°C	TO-92
DS1833-10/T&R	5V - 10%	-40°C to 85°C	TO-92 Tape & Reel
DS1833-15	5V - 15%	-40°C to 85°C	TO-92
DS1833-15/T&R	5V - 15%	-40°C to 85°C	TO-92 Tape & Reel
DS1833Z-5	5V - 5%	-40°C to 85°C	SOT-223
DS1833Z-5/T&R	5V - 5%	-40°C to 85°C	SOT-223 Tape & Reel
DS1833Z-10	5V - 10%	-40°C to 85°C	SOT-223
DS1833Z-10/T&R	5V - 10%	-40°C to 85°C	SOT-223 Tape & Reel
DS1833Z-15	5V - 15%	-40°C to 85°C	SOT-223
DS1833Z-15/T&R	5V - 15%	-40°C to 85°C	SOT-223 Tape & Reel

DALLAS
SEMICONDUCTOR

DS1833D
APPLICATION EXAMPLE

The application example below demonstrates the DS1833D performing reset functions. It performs a power on reset and a reset based on an out-of-tolerance condition at the V_{CC} input.

```
        Vcc
         |
         |
    ┌────────────┐
    │  Vcc       │
    │            │
    │            │
    │        RST ├───────────────────────────►  RESET
    │            │
    │            │
    │  GND       │
    └─────┬──────┘
          │
          ▼
         ═══
```
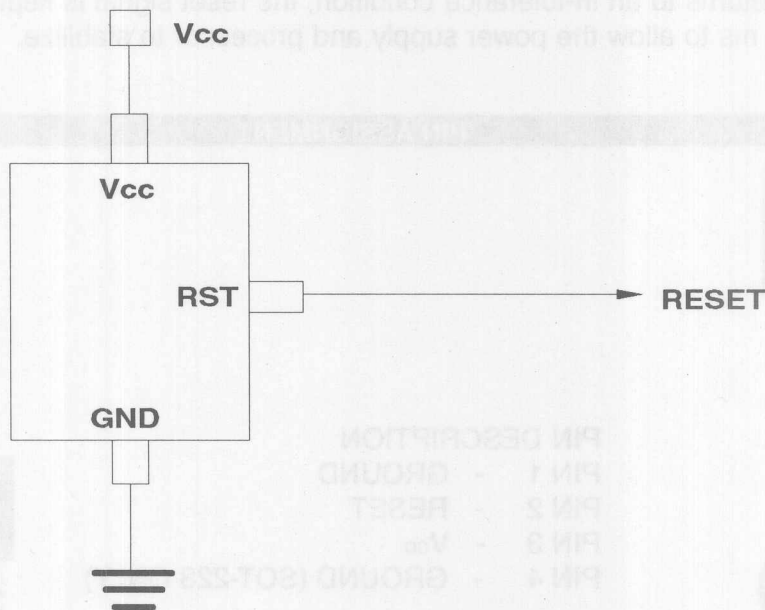
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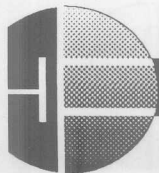Mission Viejo, CA
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